Supplementary Information

Impact of the quality of coronal restoration versus the quality of root canal fillings on success of root canal treatment: a systematic review and meta-analysis

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Table S-1. Covariate patterns for the nine studies employed for meta-analysis

No.	Study*	Type of evaluation[1]	Calibration[2]	5-point Periapical Index[3]	Seal and Length[4]
1	Ray & Trope (1995) [30]	R	N	N	N
2	Tronstad *et al*. (2000) [72]	R	Y	N	N
3	Kirkevang *et al*. (2000) [73]	R	Y	Y	Y
4	Hommez *et al*. (2002) [74]	R/C	Y	N	N
5	Dugas *et al*. (2003) [75]	R/C	Y	Y	N
6	Segura-Egea *et al*. (2004) [76]	R	Y	Y	Y
7	Siqueira *et al*. (2005) [77]	R	Y	N	N
8	Georgopoulou *et al*. (2008) [78]	R	Y	N	N
9	Tavares *et al*. (2009) [79]	R	Y	Y	N

* Authors (Year of publication) [Reference number].

[1]R: qualities of root canal treatment and coronal restorations were evaluated radiographically; R/C: qualities of root canal treatment and coronal restorations were evaluated both radiographically and clinically.

[2]Y: evaluators were calibrated; N: evaluators were not calibrated.

[3]Y: 5-point Periapical Index [50] was used to evaluate the severity of apical periodontits; N: 5-point Periapical Index was not used.

[4]Y: both seal and length of root fillings were evaluated, N: only length was evaluated.

Table S-2. Data extracted from the 9 studies for the comparison of different combinations of restorative and root canal treatment parameters

Study	Parameters for comparison		O.R.	95% C.I.	P-Value§
	AR/AE*	AR/IE*			
1. Ray & Trope (1995)	302 (91.4)	204.5 (67.6)	5.08	3.23 - 7.99	< 0.001
2. Tronstad *et al*. (2000)	294 (80.8)	168 (56.2)	3.28	2.32 - 4.63	< 0.001
3. Kirkevang *et al*. (2000)	106 (68.8)	189 (45.7)	2.63	1.78 - 3.89	< 0.001
4. Hommez *et al*. (2002)	168 (79.3)	252 (68.1)	1.79	1.20 - 2.66	0.004
5. Dugas *et al*. (2003)	57 (81.4)	43 (46.7)	5.00	2.41 - 10.35	< 0.001
6. Segura-Egea *et al*. (2004)	11(68.8)	5 (29.4)	5.28	1.20 – 23.32	0.028
7. Siqueira *et al*. (2005)	426 (71.1)	136 (37.9)	4.04	3.06 - 5.33	< 0.001
8. Georgopoulou *et al*. (2008)	161 (60.8)	107 (43.9)	1.98	1.39 - 2.82	< 0.001
9. Tavares *et al*. (2009)	143 (93.5)	330 (64.1)	8.02	4.12 - 15.6	< 0.001
	AR/AE*	IR/AE*			
1. Ray & Trope (1995)	302 (91.4)	72.5 (44.1)	13.45	8.22 - 22.00	< 0.001
2. Tronstad *et al*. (2000)	294 (80.8)	101 (71.1)	1.70	1.09 - 2.67	0.019
3. Kirkevang *et al*. (2000)	106 (68.8)	27 (52.9)	1.96	1.03 - 3.75	0.041
4. Hommez *et al*. (2002)	168 (79.3)	29 (65.9)	1.97	0.98 - 4.00	0.059
5. Dugas *et al*. (2003)	57 (81.4)	48 (60.8)	2.83	1.33 - 6.01	0.007
6. Segura-Egea *et al*. (2004)	11 (68.8)	6 (37.5)	3.67	0.85 - 15.84	0.082
7. Siqueira *et al*. (2005)	426 (71.1)	246 (65.3)	1.31	0.99 - 1.73	0.054
8. Georgopoulou *et al*. (2008)	161 (60.8)	69 (32.9)	3.16	2.17 - 4.62	< 0.001
9. Tavares *et al*. (2009)	143 (93.5)	37 (82.2)	3.09	1.14 - 8.38	0.027
	IR/AE*	AR/IE*			
1. Ray & Trope (1995)	72.5 (44.1)	204.5 (67.6)	0.38	0.26-0.56	< 0.001
2. Tronstad *et al*. (2000)	101 (71.1)	168 (56.2)	1.92	1.25-2.95	0.003
3. Kirkevang *et al*. (2000)	27 (52.9)	189 (45.7)	1.34	0.75-2.40	0.326
4. Hommez *et al*. (2002)	29 (65.9)	252 (68.1)	0.91	0.47-1.75	0.768
5. Dugas *et al*. (2003)	48 (60.8)	43 (46.7)	1.76	0.96-3.25	0.068
6. Segura-Egea *et al*. (2004)	6 (37.5)	5 (29.4)	1.44	0.34-6.16	0.623
7. Siqueira *et al*. (2005)	246 (65.3)	136 (37.9)	3.08	2.28-4.16	< 0.001
8. Georgopoulou *et al*. (2008)	69 (32.9)	107 (43.9)	0.63	0.43-0.92	0.017
9. Tavares *et al*. (2009)	37 (82.2)	330 (64.1)	2.59	1.18-5.69	0.017

The first column group labels: "AR/AE vs AR/IE", "AR/AE vs IR/AE", "IR/AE vs AR/IE".

Abbreviations:
 AR: Adequate coronal restoration; **IR**: Inadequate coronal restoration.
 AE: Adequate root canal treatment; **IE**: Inadequate root canal treatment.
 O.R.: odds ratio; **C.I.**: confidence interval.
* Number of patients (percent) without apical periodontitis.
§ Values < 0.05 are statistically significant.

Table S-3. **A**. Adjusted odds ratios for comparison of AR/AE *vs* AR/IE (n = 4776). **B**. Adjusted odds ratios for homogeneous subsets for comparison of AR/AE *vs* AR/IE

A	Predictor	Coefficient[2]	Standard Error[2]	P-value[2]	O.R.[2]	95% C.I.[2]
	Intercept	1.38	0.14	< 0.001	--	--
	AR/AE vs. AR/IE	1.00	0.07	< 0.001	2.73	2.40 – 3.11
	Type of Evaluation (R *vs* R/C)[1]	-0.44	0.09	< 0.001	0.65	0.54 – 0.77
	Calibration (yes/no)	-0.86	0.11	< 0.001	0.42	0.34 – 0.52
	Seal & Length (yes/no)	-0.28	0.09	0.003	0.76	0.63 – 0.91

[1]R: qualities of root canal treatment and coronal restorations were evaluated radiographically; R/C: qualities of root canal treatment and coronal restorations were evaluated both radiographically and clinically.
[2]Adjusted for all other variables in the logistic regression model.

B	Subset	Studies	Covariate Pattern[1]	O.R.[2]	95% C.I.[2]	P-value[2]
	1	1	100	4.35	2.79 – 6.80	< 0.001
	2	3, 6	111	2.43	1.67 – 3.52	< 0.001
	3	4, 5	010	3.02	2.11 – 4.34	< 0.001
	4	2, 7, 8, 9	110	2.57	2.19 – 3.01	< 0.001

[1]100: radiographic evaluation only + no calibration + length only
111: radiographic evaluation only + calibration + seal and length evaluation
010: radiographic and clinical evaluation + calibration + length only
110: radiographic evaluation only + calibration + length only
[2]Adjusted for Type of Evaluation, Calibration, and Seal and Length

Table S-4. **A**. Adjusted odds ratios for comparison of AR/AE *vs* IR/AE (n = 3292). **B**. Adjusted odds ratios for homogeneous subsets for comparison of AR/AE *vs* IR/AE.

A	Predictor	Coefficient[1]	Standard Error[1]	P-value[1]	O.R.[1]	95% C.I.[1]
	Intercept	0.53	0.12	< 0.001	--	--
	AR/AE *vs* IR/AE	0.98	0.08	< 0.001	2.67	2.29 – 3.13
	Calibration (yes/no)	-0.40	0.12	< 0.001	0.67	0.53 – 0.84
	5-Point Scale (yes/no)	0.84	0.15	< 0.001	2.31	1.72 – 3.11
	Seal & Length (yes/no)	-1.11	0.20	< 0.001	0.33	0.22 – 0.49

[1]Adjusted for all other variables in the logistic regression model.

B	Subset	Studies	Covariate Pattern[1]	O.R.[2]	95% C.I.[2]	P-value[2]
	1	1	000	3.70	2.33 – 5.87	< 0.001
	2	3, 6	111	2.48	1.39 – 4.43	< 0.001
	3	2, 4, 7, 8	100	2.62	2.18 – 3.15	< 0.001
	4	5, 9	110	4.12	2.32 – 7.32	< 0.001

[1] 000: no calibration + did not use 5-point Periapical Index + length only
111: calibration + used 5-point Periapical Index + seal and length evaluation
100: calibration + did not use 5-point Periapical Index + length only
110: calibration + used 5-point Periapical Index + length only
[2]Adjusted for Calibration, Use of a 5-Point Periapical Index, and Seal and Length

Table S-5. **A**. Adjusted odds ratios for comparison of IR/AE *vs* AR/IE (n = 3741). **B**. Adjusted odds ratios for homogeneous subsets for comparison of IR/AE *vs* AR/IE

A	Predictor	Coefficient[2]	Standard Error[2]	P-value[2]	O.R.[2]	95% C.I.[2]
	Intercept	0.55	0.09	< 0.001	--	--
	IR/AE *vs* AR/IE	0.04	0.07	0.591	1.04	0.90 – 1.20
	Type of Evaluation (R vs. R/C)[1]	-0.35	0.10	< 0.001	0.71	0.59 – 0.85
	Seal & Length (yes/no)	-0.38	0.10	0.003	0.68	0.56 – 0.83

[1]R: qualities of root canal treatment and coronal restorations were evaluated radiographically; R/C: qualities of root canal treatment and coronal restorations were evaluated both radiographically and clinically.
[2]Adjusted for all other variables in the logistic regression model.

| B	Subset	Studies	Covariate Pattern[1]	O.R.[2]	95% C.I.[2]	P-value[2]
	1	1, 2, 7, 8, 9	10	1.039	0.89 – 1.22	0.638
	2	3, 6	11	1.038	0.62 – 1.74	0.886
	3	4, 5	00	1.042	0.69 – 1.58	0.847

[1] 10: radiographic evaluation only + length only
11: radiographic evaluation only + seal and length evaluation
00: radiographic and clinical evaluation + length only
[2]Adjusted for Type of Evaluation and Seal and Length

Fig. S-1 **A**. L'Abbé plot of odds ratios based on data from 9 studies for the comparison of AR/AE *vs* AR/IE with regard to absence of apical periodontitis. The size of each circle is proportional to the total sample size for the AR/AE vs. AR/IE comparison in that study. The solid line indicates an odds ratio of 1.0. Circles above the line indicate that patients in the AR/AE treatment group had lower odds of apical periodontitis than those in the AR/IE treatment group. Circles in red indicate statistical significance. **B**. L'Abbé plot of adjusted odds ratios based on data from the same 9 studies after adjusting for Type of Evaluation, Calibration, and Seal and Length. The 9 studies were divided into 4 homogeneous subsets based on their pattern of values for these covariates, and the common odds ratios in each subset are represented in the graph. Circles in red indicate statistical significance. Study designations: **1**. Ray and Trope (1995) ; **2**. Tronstad *et al*. (2000); **3**. Kirkevang *et al*. (2000) ; **4**. Hommez *et al*. (2002) ; **5**. Dugas *et al*. (2003) ; **6**. Segura-Egea *et al*. (2004) ; **7**. Siqueira *et al*. (2005) ; **8**. Georgopoulou *et al*. (2008); **9**. Tavares *et al*. (2009).
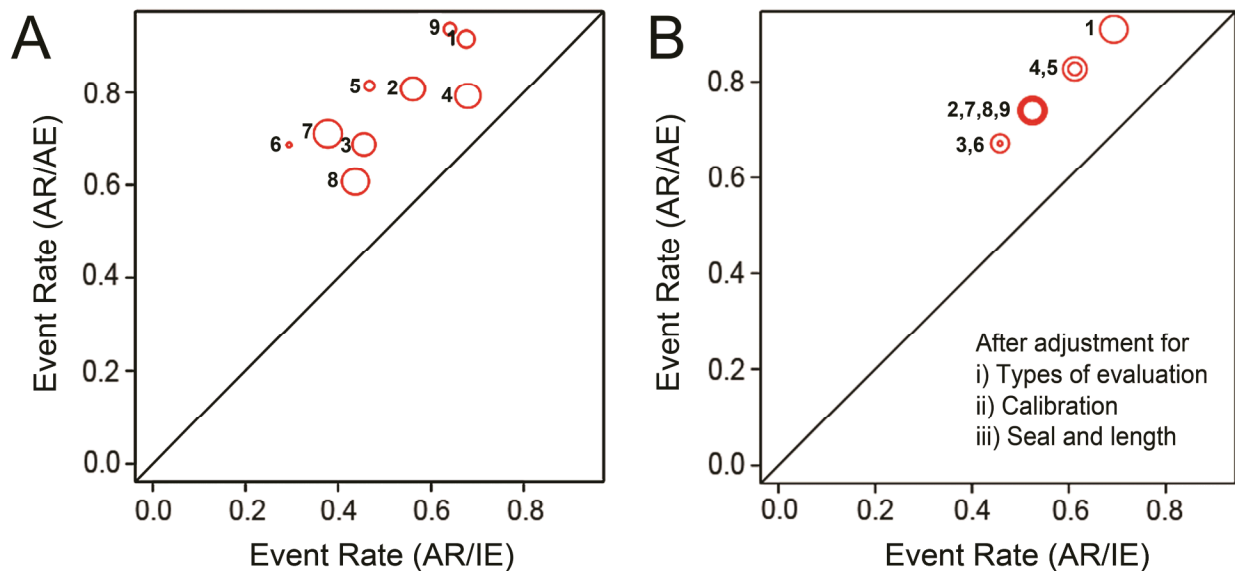
Fig. S-2 **A**. L'Abbé plot of odds ratios based on data from 9 studies for the comparison of AR/AE *vs* IR/AE with regard to absence of apical periodontitis. Size of each circle is proportional to the total sample size for the AR/AE vs. IR/AE comparison in that study. The solid line indicates an odds ratio of 1.0. Circles above the line indicate that patients in the AR/AE treatment group had lower odds of apical periodontitis than those in the IR/AE treatment group. Circles in red indicate statistical significance. **B**. L'Abbé plot of adjusted odds ratios based on data from the same 9 studies for the comparison of AR/AE *vs* IR/AE after adjusting for Calibration, Use of a 5-Point Periapical Index, and Seal and Length. The 9 studies were divided into 4 homogeneous subsets based on their pattern of values for these covariates, and the common odds ratios in each subset are represented in the graph. Circles in red indicate statistical significance. Study designations: **1**. Ray and Trope (1995) ; **2**. Tronstad *et al*. (2000); **3**. Kirkevang *et al*. (2000) ; **4**. Hommez *et al*. (2002) ; **5**. Dugas *et al*. (2003) ; **6**. Segura-Egea *et al*. (2004) ; **7**. Siqueira *et al*. (2005) ; **8**. Georgopoulou *et al*. (2008); **9**. Tavares *et al*. (2009).
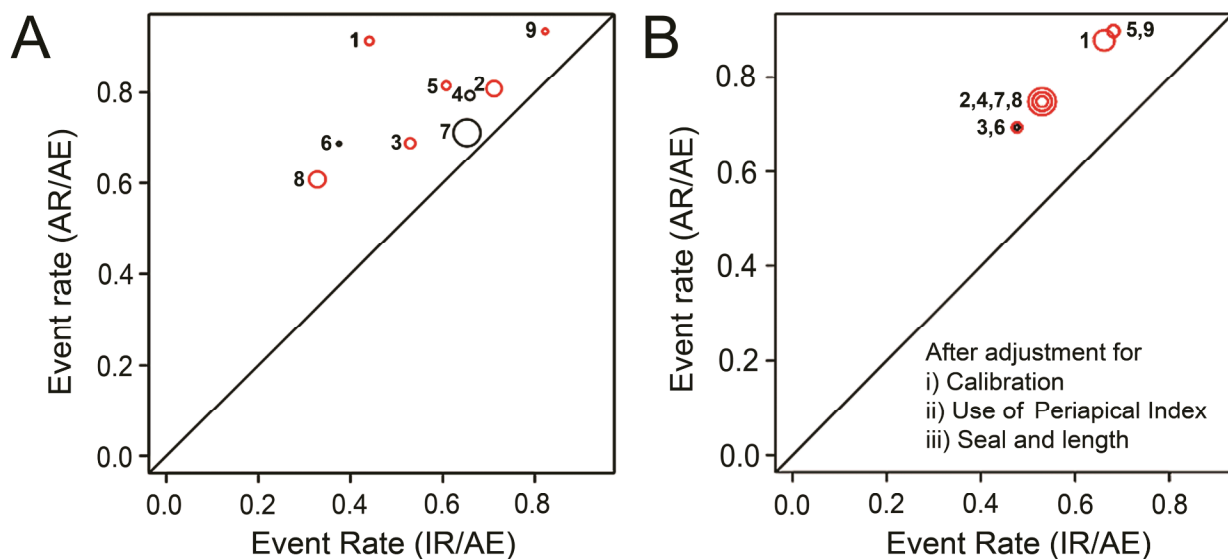
Fig. S-3 L'Abbé plot of odds ratios based on data from 9 studies for the comparison of IR/AE *vs* AR/IE with regard to absence of apical periodontitis. The size of each circle is proportional to the total sample size for the IR/AE *vs* AR/IE comparison in that study. The solid line indicates an odds ratio of 1.0. Circles above the line indicate that patients in the AR/IE treatment group had lower odds of apical periodontitis; circles below the line indicate that patients in the IR/AE treatment group had lower odds. Circles in red indicate statistical significance. **B**. L'Abbé plot of adjusted odds ratios for the comparison of IR/AE *vs* AR/IE *vs*, after adjusting for Type of Evaluation and Seal and Length. The 9 studies were divided into 3 homogeneous subsets based on their pattern of values for these covariates, and the common odds ratios in each subset are represented in the graph. None of the adjusted odds ratios were statistically significant. Study designations: **1**. Ray and Trope (1995) ; **2**. Tronstad *et al*. (2000); **3**. Kirkevang *et al*. (2000) ; **4**. Hommez *et al*. (2002) ; **5**. Dugas *et al*. (2003) ; **6**. Segura-Egea *et al*. (2004) ; **7**. Siqueira *et al*. (2005) ; **8**. Georgopoulou *et al*. (2008); **9**. Tavares *et al*. (2009).